MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 3, 2015/2016

EME1016 – APPLIED STATICS

(ME)

31 MAY 2016
2:30 – 4:30 p.m.
(2 Hours)

INSTRUCTIONS TO STUDENTS

1.This exam paper consists of only five printed pages, including this cover page.

2. Answer all questions.

3. Write all your answers in the answer booklet provided.

Question 1

a). The airstroke actuator at *D* (see Fig. 1a) is used to apply a force of ***F*** on the member at *B*. The normal reaction of the smooth shaft at *C* on the member is 300 N. Determine the magnitude of ***F*** and the horizontal and vertical components of reaction at pin *A*. [10 marks]

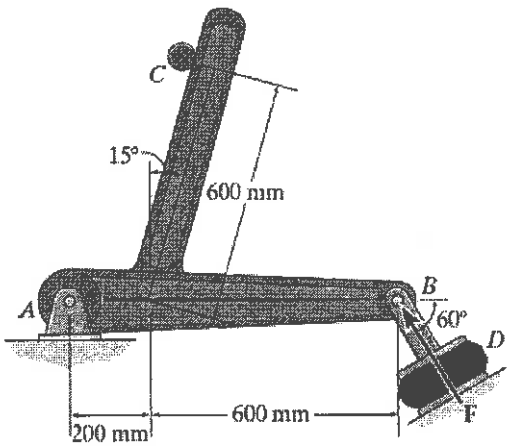

Figure 1a

b). The floor crane and the driver have a total weight of 12.5 kN with a center of gravity at *G* (see Fig. 1b). Determine the largest weight of the drum that can be lifted without causing the crane to overturn when its boom is in the position shown. [7 marks]

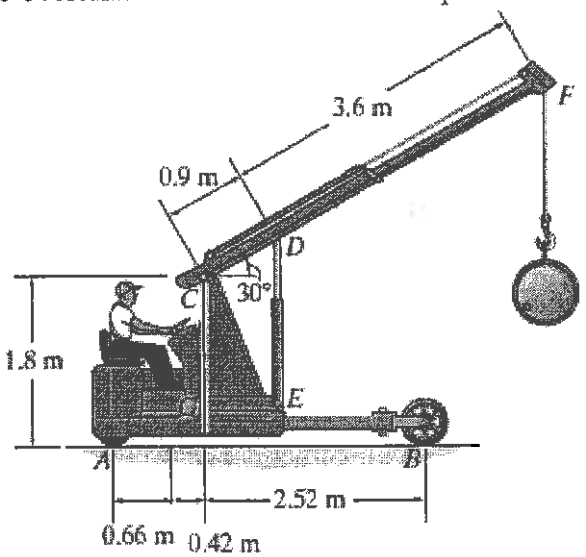

Figure 1b

c). Why does a car nose up when accelerating, and nose down when braking? [3 marks]

Continued . . .

Question 2

a). Determine the force in members *HI*, *FI*, and *EF* of the truss (see Fig. 2a), and state if the members are in tension or compression. [10 marks]

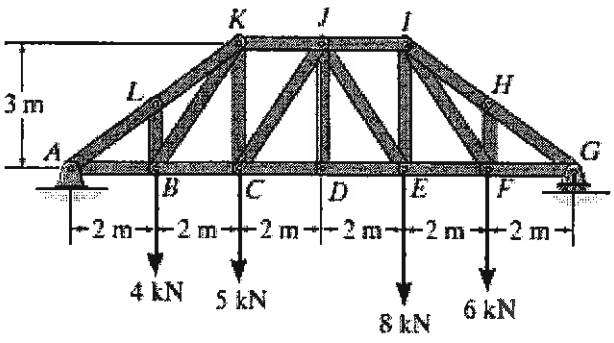

Figure 2a

b). Why do trusses have only triangle members? [10 marks]

Question 3

a). Determine the internal normal force, shear force, and moment at point *C* in the cantilever beam. See Fig. 3a. [10 marks]

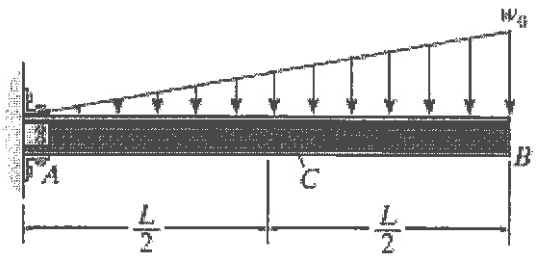

Figure 3a

b). The jack *AB* is used to straighten the bent beam *DE* using the arrangement shown in Fig. 3b. If the axial compressive force in the jack is 2.5 kN, determine the internal moment developed at point *C* of the top beam. Neglect the weight of the beams. [10 marks]

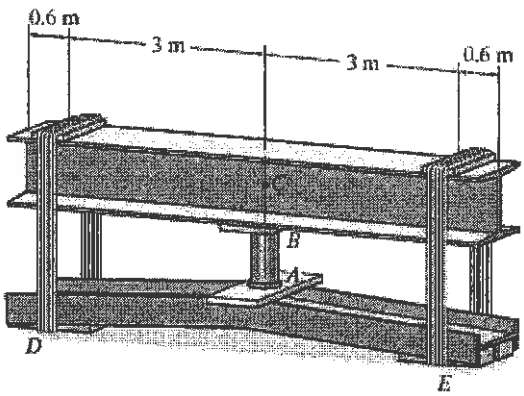

Figure 3b

Continued . . .

Question 4

a). Locate the centroid from the x-axis of the shaded area shown in Fig. 4a. [10 marks]

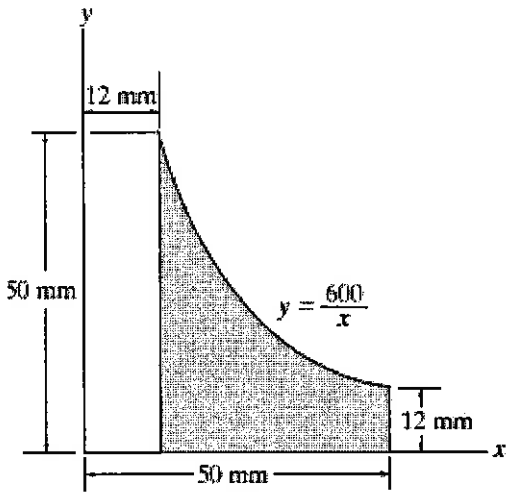

Figure 4a

b). Determine the moment of inertia of the beam's cross-sectional area about the y-axis. See Fig. 4b. [7 marks]

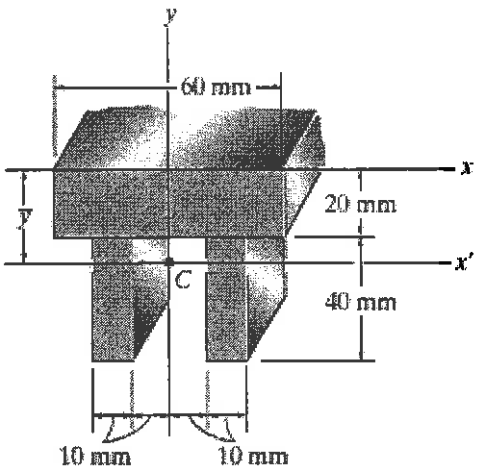

Figure 4b

c). When a car drives off a cliff, why does it rotate as it falls? [3 marks]

Continued . . .

Question 5

a). Determine the minimum applied force ***P*** required to move wedge *A* to the right. See Fig. 5a. The spring is compressed a distance of 175 mm. Neglect the weight of *A* and *B*. The coefficient of static friction for all contacting surfaces is 0.35. Neglect friction at the rollers. [10 marks]

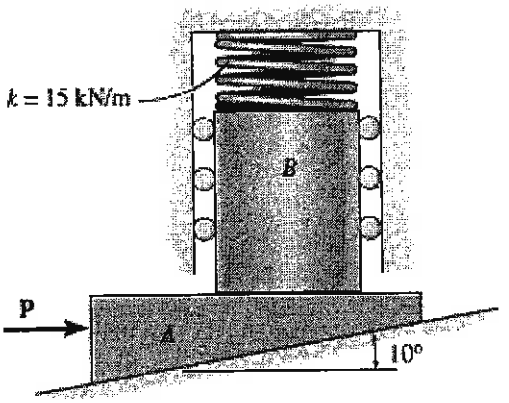

Figure 5a

b). The 20-kg cylinder *A* and 50-kg cylinder *B* are connected together using a rope that passes around a rough peg two and a half turns. See Fig. 5b. If the cylinders are on the verge of moving, determine the coefficient of static friction between the rope and the peg. [10 marks]

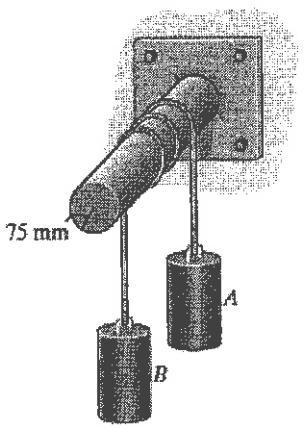

Figure 5b

End of Paper